

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Mealworm inclusion in Label chicken diet does not affect both performance and welfare parameters

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1547473> since 2020-05-07T10:50:32Z

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

C-149

Mealworm inclusion in Label chicken diet does not affect both performance and welfare parameters

Achille Schiavone¹, Michele De Marco¹, Martina Tarantola¹, Francesco Gai², Luisa Pozzo², Laura Cavallarin², Stefania Bergagna³, Daniela Dezzutto³, Maria Silvia Gennero³, Luca Rotolo⁴, Manuela Renna⁴, Sihem Dabbou⁴, Alberto Brugiapaglia⁴, Laura Gasco^{2,4}

¹Dipartimento di Scienze Veterinarie, Università degli Studi di Torino, Grugliasco (TO), Italy

²Istituto di Scienze delle Produzioni Alimentari, Consiglio Nazionale delle Ricerche, Grugliasco (TO), Italy

³Istituto Zooprofilattico Sperimentale del Piemonte, Liguria e Valle d'Aosta, Torino, Italy

⁴Dipartimento di Scienze Agrarie, Forestali ed Alimentari, Università degli Studi di Torino, Grugliasco (TO), Italy

Corresponding author: achille.schiavone@unito.it

The use of insects as an alternative source of protein in animal feed is becoming more globally appealing, also in poultry. Soybean or fish meal in broiler chicken or laying hen have been successfully replaced at low inclusion levels by black soldier flies (*Hermetia illucens*), housefly (*Musca domestica*), mealworms (*Tenebrio molitor*, TM) and silkworm (*Bombix mori*) pupae. In this experiment, female Label chickens were reared in free range condition (5 replicates per treatment and 12 birds per replicate). Birds were housed at the age of 42 days (average weight 715 g). Two experimental diets were designed: 72.0% corn, 17.0% soybean meal, 7.5% gluten meal (C-group) or mealworm meal (TM-group) and 3.5% mineral-vitamin premix. Diets were formulated using AMEn values calculated for broiler chickens by our research group (Schiavone *et al.*, 2015). C-group and TM group diets were isoenergetic (AMEn: 12.18 and 12.22 MJ/kg, respectively) and isonitrogenous (crude protein: 16.9% and 16.8%, respectively). The experiment lasted 60 days. Birds were weighted at the beginning and at the end of the experiment. At slaughtering, blood samples were taken and the main commercial cuts were evaluated (carcass for grilling, breast and thigh) as well as liver, spleen and Bursa of Fabricius weights. In addition foot pad dermatitis score was evaluated according to the EU Commission recommendations. Data were analysed by Student's t-Test for independent samples. C-group and TM-group displayed similar final body weight (2131 *vs.* 2162 g), feed conversion ratio (4.37 *vs.* 4.36 g), carcass for grilling (1459 *vs.* 1545 g), breast (347 *vs.* 371 g), thigh (497 *vs.* 503 g), abdominal fat (41 *vs.* 45 g), liver (37 *vs.* 39 g), spleen (4.0 *vs.* 3.8 g) and Bursa of Fabricius (4.3 *vs.* 4.2 g). By comparing blood analysis of C-group *vs.* TM-group data of red (2.4 *vs.* 2.6 millions) and white blood cells (9.4 *vs.* 9.9 thousands), H/L ratio (0.55 *vs.* 0.51), total protein (3.98 *vs.* 4.05 d/dl), AST (190 *vs.* 198), ALT (14.5 *vs.* 14.0 U/L), uric acid (5.0 *vs.* 3.9 mg/dl), triglycerides (43.4 *vs.* 47.8 mg/dl) and glucose (262 *vs.* 244 mg/dl) no significant differences were found. Birds

did not displayed any foot pad dermatitis lesion. In conclusion TM meal can be safely used as feed ingredient for Label chicken at the inclusion level of 7.5% without affecting growth and slaughter performance as well as blood and welfare parameters.

C-150

Haematological, biochemical and serum protein profiles during lactation in Modenese and Italian Friesian cattle breeds

Francesca Petrera, Alessandra Gubbiotti, Fabio Abeni

Centro di Ricerca per le Produzioni Foraggere e Lattiero-casearie, Consiglio per la Ricerca in Agricoltura e l'Analisi dell'Economia Agraria, Cremona, Italy

Corresponding author: francesca.petrera@entecra.it

The aim of this study was to evaluate the variations of the blood parameters during lactation in the Modenese (MO) cow, a dual-purpose autochthonous cattle breed, included in the endangered-maintained breeds list of FAO (2000), for assessing its nutritional and health status compared to a specialized dairy breed, the Italian Friesian (IF). The study was carried out on 25 pluriparous lactating cows, 11 MO and 14 IF that were housed in a free-stall barn, under identical conditions of feeding and management, in a commercial farm. Blood samples from all cows were drawn from jugular vein at peak (8 wk) and mid lactation (21 wk) and analyzed for haematological and biochemical profiles, by automated analyzers, and serum protein profile, by agarose gel electrophoresis, using commercial kits. Body condition score (BCS) was evaluated after blood collection. The effects of breed, time (T8 and T21) and their interaction were assessed by a mixed model ANOVA. On average, MO cows showed higher BCS, plasma creatinine, potassium (K), alkaline phosphatase (ALP), tartrate resistant acid phosphatase (TRAP), alanine aminotransferase (ALT), hemoglobin (Hb), hematocrit (Hct), basophils (as % of total white blood cells, WBC), platelets count (PLT); but lower cholesterol, total protein, globulins, magnesium (Mg), and neutrophil (NEU, as % of WBC) compared to IF cows. The stage of lactation affected plasma glucose, non-esterified fatty acids (NEFA), urea, total iron binding capacity (TIBC), red blood cells (RBC), mean corpuscular volume (MCV), mean concentration hemoglobin (MCH), and serum β -globulin percentage in both the breeds. At T21 IF cows showed higher values of urea, phosphorous (P), aspartate aminotransferase (AST), ALT, WBC, and NEU count compared to T8, whereas MO did not. Breed x time interaction had no effect on any of the considered variables. We speculated that the observed differences were possible consequences of the different genetic selection criteria adopted for IF compared to MO cows, because some of these blood parameters are under genetic control. These results could help to gain a greater understanding of the physiological status of this local breed and of the mechanisms that characterize the MO for functional traits